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(71) Applicant *(for all designated States except US)*: ITSAC N.V. [NL/NL]; Chuchubiweg 17, Willemstad, Curaçao (AN).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: LAST, Laureus [NL/MC]; Parc Saint Roman, 7, Avenue de St. Roman, MC-98000 Monte Carlo (MC).

(74) Agent: BROOKHUIS, H., J., A.; Exter Polak & Charlouis B.V., P.O. Box 3241, NL-2280 GE Rijswijk (NL).

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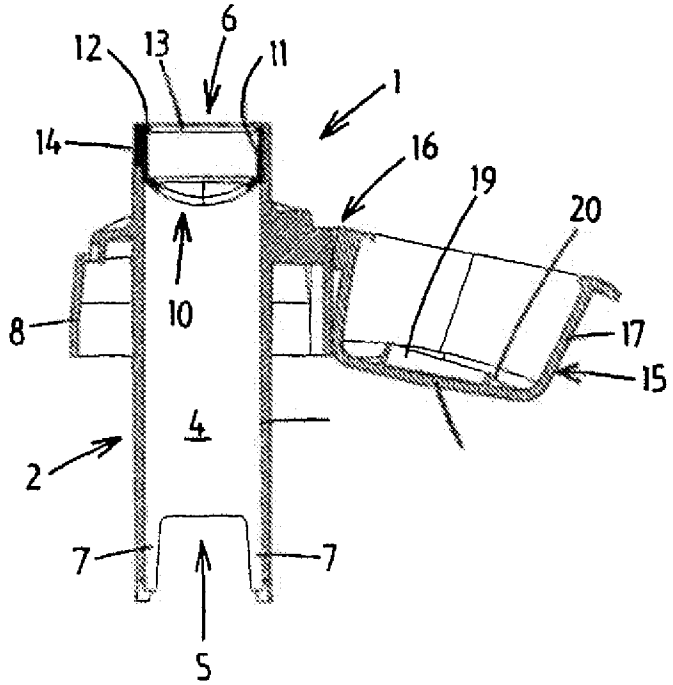
(54) Title: DISPENSING SPOUT AND CAP ASSEMBLY



(57) Abstract: A dispensing spout and cap assembly having a dispensing spout, which is mountable on a container for a liquid product or is integral with the container. The spout has a dispensing channel with an inlet opening and a dispensing opening for the product to be dispensed from the container. In the dispensing channel a self-closing valve is arranged for closing the dispensing channel. The self-closing valve and the dispensing spout are manufactured by co-injection of a first thermoplastic material for the valve and a second thermoplastic material for the spout, wherein the second material is more rigid than the first material. The assembly further comprises a movable cap for closing the dispensing channel near the dispensing opening, which cap has an annular sealing surface of the spout. The spout is provided with an annular sealing element made from the first thermoplastic material and formed during the co-injection, which sealing element forms the sealing surface of the spout co-operating with the cap.

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Dispensing spout and cap assembly

The present invention relates according to a first aspect thereof to a dispensing spout and cap assembly according to the preamble of claim 1.

Such an assembly is known from the prior art. The cap serves on the one hand as reliable closure and on the other hand the cap prevents the penetration of dirt into the dispensing channel. If the container is in use, the self-closing valve prevents the undesired dispensing of fluid from the container, for example as the container with opened cap comes to lie on its side.

By using co-injection of two different plastic materials an optimum choice of material can be obtained for the spout, and possibly the cap integrally moulded thereon, on the one hand and for the self-closing valve on the other hand. Furthermore co-injection forms an efficient production manner, which is important for such mass-produced products.

The first aspect of the present invention aims to provide an improved assembly.

The present invention reaches this aim by providing an assembly according to the preamble of claim 1, which is characterised in that the spout is provided with an annular sealing element of the first thermoplastic material formed during the co-injection, which sealing element forms the sealing surface of the spout co-operating with the cap.

By the measure according to the invention it possible to put less strict requirements on the close fit between the co-operating sealing surfaces of the cap and of the spout then if the sealing surface of the spout were to be manufactured from the second more rigid material. The use of the softer first material for the sealing element of the spout obtained by co-injection, allows in particular larger tolerances, for example as far as the dimensions of the cap and the spout are concerned.

In particular if the cap is connected pivotally to the spout, larger tolerances concerning the positioning and path of the cap with respect to the spout are admissible without disadvantageous consequences for the eventually obtained sealing functioning of the cap.

In a preferred embodiment of the assembly the annular sealing element made from the first thermoplastic material is integrated with the self-closing valve, such that the inside of the spout in the area between the valve and the annular sealing element is wholly or partially covered with the first thermoplastic material. By this integral design the injection moulding is simplified and also a reliable joining over a relative large surface of the integrated part of the first material and the second material is obtained.

Preferably the annular sealing element made from the first thermoplastic material is present on the inside or on the outside of the spout manufactured from the more rigid second material. Because of this the more rigid material of the spout provides ás it were a stable collar where the softer sealing element lies within or around. Hereby an optimum sealing function of the cap can be reached.

In a preferred embodiment of the assembly according to the invention it is provided that - at the dispensing opening - a soft rim made from the first thermoplastic material is formed at the spout during co-injection, which soft rim extends beyond the part of the spout formed by the second more rigid material. This soft rim is in particular advantageous if the container contains a beverage for the human consumption, wherein it is then intended that the spout is placed at the mouth to drink. The soft rim then prevents that the edge of the spout manufactured of the second more rigid material comes against the teeth or feels sharp, a so-called teat-effect. For example this soft rim extends some millimetres, for example 5 millimetre, beyond the more rigid part of the spout.

Also such a soft rim is advantageous if the container for example contains a medicament that should be brought into the eye or ear.

Preferably the aforesaid soft rim is integral with the self-closing valve and with the annular sealing element.

In a further alternative it can be provided that the outer periphery of the spout at least near the dispensing opening is covered with the soft first thermoplastic material. The advantages thereof correspond to those of the soft rim described herein before.

In another alternative the cap is adapted to seal the outer periphery of the spout and it is provided that the annular sealing element made from the first thermoplastic material is present on the outer periphery of the spout.

Preferably the cap is connected by means of a pivoting connection to the spout.

The self-closing valve preferably has a diaphragm extending transversely across the dispensing channel and having in one or more incisions therein forming the passage orifice for the product. The incisions can extend entirely though the diaphragm. In an advantageous alternative it is envisaged that the incision has a such depth that the diaphragm is still closed, wherein the incision then forms an area that can be easily ruptured in the diaphragm. Upon first use a rupture can be brought about, for example squeezing the container or sucking on the spout. Then the pressure on the diaphragm leads to the rupture of the area. An advantage of this solution is that the diaphragm stays intact as long as possible and can thus for example contribute to the protection of the product with respect to the atmosphere.

A second aspect of the present invention relates to a method according to claim 14. By already providing the incision or incisions, either non-continuous or continuous, in the diaphragm of the self-closing valve at the moment the assembly itself still is in the injection mould, a very effective production, with a short cycle time, is possible since it is not necessary to remove the assemblies first from to the mould and then feed them to a separate cutting device. Preferably also the closing of the cap occurs as the assembly still is in

the mould by a cap closing mechanisms associated with the mould.

A third aspect of the invention relates to an assembly according to claim 16. By introducing snap means one guarantees that the cap remains opened. If the container is intended for a beverage that is consumed by taking the spout into the mouth, it is preferred that the pivot connection allows an opening swing of the cap of an angle of approximately 180 degrees and that the cap is held opened in this opened position by the snap means. Because of this the cap is not in the way when drinking from the container.

The container can have many embodiments, for example a flexible pouch or a squeezable plastic container with a self-restoring shape, which adopts its original shape after release, or a container with a rigid wall.

It will be clear that the mentioned aspects of the invention can be applied separately but also in several combinations.

The various aspects of the invention will now be explained by means of the drawings, in which a preferred embodiment of the assembly according to the invention is shown.

In the drawings:

Fig. 1 shows the assembly in perspective with the cap in opened position,

Fig. 2 shows the assembly of figure 1 from above,

Fig. 3 shows the assembly of figure 1 from the front,

Fig. 4 shows the assembly of figure 1 in cross section over the line IV-IV in figure 3,

Fig. 5 shows the assembly of figure 1 with closed cap,

Fig. 6 shows the assembly of figure 5 from above,

Fig. 7 shows the assembly of figure 5 from the front,

Fig. 8 shows the assembly of figure 5 in cross section over the line VIII-VIII in figure 7,and

Fig. 9 shows on a larger scale in perspective the snap connection for keeping the cap open in the assemblies according to the figures 1-8.

The figures 1-9 show a dispensing spout and cap assembly 1 according to the invention, which is adapted to be mounted on a container which is filled with a liquid product.

The assembly as shown is in particular adapted to be mounted in a female element fitted on the container in the manner as shown in WO 00/66488. Here the female element has a body with an axial bore extending there through. This bore extends from an insertion opening for the assembly 1 at the outside of the container to a seat for a plug, which is located inside the container.

The assembly 1 comprises a dispensing spout 2 having a tubular part 3, which delimits a dispensing channel 4 for the product. The channel 4 has an inlet opening 5 and a dispensing opening 6 for the product, which is to be dispensed from the container.

The tubular part 3 in this example is provided with two lugs 7, which extend axially beyond the inlet opening, which lugs are intended to engage on the plug in order to push it from its seat as described in WO 00/66448.

Furthermore the spout 2 has an oval collar wall 8, which extends around the tubular part 3. An annular upper wall 9 having an oval outer contour connects the collar wall 8 at the top to the tubular part 3.

At a distance remote from the dispensing opening 6 of the channel 4 a self-closing valve 10 is present in the tubular part 3 for closing the dispensing channel 4. The valve 10 opens if a pressure difference is present over the valve, which pressure difference can be obtained for instance by squeezing the container or sucking on the spout.

The valve 10 as shown is of a known type having a flexible diaphragm, which extends across the dispensing channel and with

one or more incisions 10a therein that form the passage orifice for the product. In this example a cross-shaped incision 10a has been made.

The incision 10a in this example extends fully through the diaphragm. In an alternative the incision 10a is not fully through the material and a frangible zone remains in the diaphragm, which zone can be ruptured by pressurising the container (for example by squeezing) or sucking on the spout 2.

In an alternative the valve 10 is embodied as a duckbill valve.

The assembly 1 further comprises a cap 15 for closing the dispensing channel 4 near the dispensing opening. The cap 15 is connected to the spout 2 by means of a film-hinge connection 16. The cap 15 has an oval outer wall 17 and an upper wall 18, which connects to the upper rim of the outer wall 17. Further the cap 15 has a downward extending cylindrical rib 19 at the lower side of the upper wall 18, which rib 19 at its outer circumference forms an annular sealing surface of the cap 15.

The cap 15 further has a latching lug 21 diametrically opposite the film-hinge 16, which can engage in an associated latching depression 22 of the spout 2.

The diaphragm of the valve 10 connects at its outer circumference to an annular wall 11, which extends from the valve 10 to closely beneath the upper end of the tubular part 3. At its end remote from the valve 10 the annular wall 11 is provided with an inwardly protruding rib 12, which forms the annular sealing surface 13 of the spout 2.

On the annular wall 11 an outwardly extending axial rib 14 is provided, which fills a corresponding slot in the wall of the tubular part 3.

The self-closing valve 10 with the annular wall 11 and the rib 12 are made of a first thermoplastic material.

The spout 2 with in particular the tubular part 3 and with the cap 15 are made from a second thermoplastic material, which at normal operating temperature, in particular ambient temperature, is more rigid than the first thermoplastic material. The first material has such flexibility that the valve 10 fulfils its self-closing function. This flexibility also entails the advantageous effect that the rib 12 is flexible. Upon closing the cap 15 (see figure 8) the sealing surface of the cap 15 presses against this flexible rib 12. The surrounding of this flexible rib 12 by the stiffer material of the tubular part 3 contributes to the reliable closing function of the cap 15. Further the force which is needed to open and close the cap 15 can be kept limited in this manner.

The reliable sealing of the cap 15 is for instance relevant if bacterial contamination can occur and the cap 15 serves to prevent such a contamination.

Instead of a pivoting cap 15 also another type of cap could be provided, e.g. a screw cap, twist cap, etc.

The valve 10 lies a distance towards the inside in the dispensing channel 4 as seen from the dispensing opening 6. This distance is such that one who places the spout 2 in the mouth can not reach the valve 10 with the tongue. Hereby it is prevented that the person inadvertently prevents the opening of the valve 10.

In an alternative 1' shown in figure 10 of the assembly 1 described above a soft rim 30 of the first thermoplastic material is formed on the spout 2 near the dispensing opening, which rim 30 extends beyond the tubular part 3 of the spout 2 formed by the second more rigid material. This soft rim 30 is integral with the self-closing valve 10 and the annular wall 11. In this embodiment also the outer circumference of the

spout is at least near the dispensing opening covered with the first thermoplastic material.

It is possible to manufacture the assembly 1 and 1' by first manufacturing the assembly 1, 1' using the co-injection technique in a suitable injection mould and then removing the assembly from the mould so that subsequently the incision 10a in the diaphragm of the valve 10 is made using a cutting device. It is however advantageous to use a mould having cutting means which allow for the application of the one or more incision in the diaphragm of the self-closing valve after the injection moulding.

In an alternative embodiment the application of the incision 10a in the valve 10 is effected with a device which also brings about the closing of the cap 15.

Referring to figure 9 it will now be described how the cap 15 is held in its opened position with respect to the spout 2.

The cap 15 is provided with a rib 41 extending transverse to the pivot axis, which projects from the periphery of the cap 15. Bosses 42 are formed on opposite sides of the rib 41, which project sideways.

The spout 2 is provided with two ribs extending transverse to the pivot axis, which project beyond the periphery of the spout 2. On these ribs 42,45 inwardly projecting snap members 44, 45 are formed.

The rib 41 of the cap 15 comes between the ribs 42, 43 of the spout 2 as the cap 15 is fully opened and the bosses 42 then lie behind the snap members 44, 45, so that the cap is held open.

If the container on which the assembly is mounted is a flexible bag, the effect occurs that upon dispensing the

product from the bag, no air has to flow into the bag, which is a necessity if the container has a shape-restoring wall.

C L A I M S

1. Dispensing spout and cap assembly comprising:

- a dispensing spout, which is mountable on a container for a liquid product or is integral with the container, which spout defines a dispensing channel with an inlet opening and a dispensing opening for the product to be dispensed from the container,

- a self-closing valve arranged in the dispensing channel for closing the dispensing channel,

in which the self-closing valve and the dispensing spout are manufactured by co-injection of a first thermoplastic material for the valve and a second thermoplastic material for the spout, wherein the second material is more rigid than the first material, and

- a movable cap for closing the dispensing channel near the dispensing opening, which cap has an annular sealing surface that co-operates with an associated annular sealing surface of the spout,

characterised in that the spout is provided with an annular sealing element made from the first thermoplastic material and formed during the co-injection, which sealing element forms the sealing surface of the spout co-operating with the cap.

2. Assembly according to claim 1, wherein the annular sealing element made from the first thermoplastic material is integral with the self-closing valve and covers the inside of the spout between the valve and the annular sealing element.

3. Assembly according to claim 1 or 2, wherein the annular sealing element of the first thermoplastic material is present within the spout.

4. Assembly according to one or more of the preceding claims, wherein a soft rim made from the first thermoplastic material is formed on the spout at the dispensing opening, which rim extends beyond the part of the spout formed by the second more rigid material.

5. Assembly according to claim 4, wherein the soft rim is integral with the sealing valve and with the annular sealing element.

6. Assembly according to one or more of the preceding claims, wherein the outer periphery of the spout at least near the dispensing opening is covered with the first thermoplastic material.

7. Assembly according to claim 1, wherein the annular sealing element of the first thermoplastic material is present on the outer periphery of the spout.

8. Assembly according to one or more of the preceding claims, wherein the cap is connected by means of an pivot connection to the spout.

9. Assembly according to claim 8, wherein snap means are provided which hold the cap in the opened position with respect to the spout.

10. Assembly according to claim 9, wherein the snap means comprise a boss formed on the cap, which is located a distance from the pivot axis formed by the pivot connection, and further comprise flexible snap members formed on the spout, wherein the boss comes between the snap members upon fully opening the cap and is held there between.

11. Assembly according to claim 10, wherein the cap is provided with a rib extending transverse to the pivot axis,

which projects from the periphery of the cap, and wherein the boss is formed on the rib, and wherein the spout is provided with two ribs extending transverse to the pivot axis, which project beyond the periphery of the spout and on which the snap members are formed, and wherein the rib of the cap comes between the ribs of the spout as the cap is fully opened and the snap members engage on the boss.

12. Assembly according to one or more of the preceding claims, wherein the spout is adapted to be fixed on the container with a snap connection.

13. Assembly according to one or more of the preceding claims, wherein the self-closing valve has a diaphragm with one or more incisions that form the passage orifice for the product.

14. Method for the manufacturing a dispensing spout and cap assembly comprising:

- a dispensing spout, which is mountable on a container for a liquid product or is integral with the container, which spout defines a dispensing channel with an inlet opening and a dispensing opening for the product to be dispensed from the container,

- a self-closing valve arranged in the dispensing channel for closing the dispensing channel, which self-closing valve has a diaphragm extending across the dispensing channel,

in which the self-closing valve and the dispensing spout are manufactured by co-injection of a first thermoplastic material for the valve and a second thermoplastic material for the spout, wherein the second material is more rigid than the first material,

characterised in that use is made of a mould with associated cutting means for providing - after the injection moulding of

the assembly - at least one incision in the diaphragm of the self-closing valve as the assembly still is in the mould, which incision forms the passage orifice for the product.

15. Method according to claim 14, wherein the incision is such that the diaphragm remains closed and a zone, which can be ruptured, is formed in the diaphragm.

16. A dispensing spout and cap assembly comprising:

- a dispensing spout, which is mountable on a container for a liquid product or is integral with the container, which spout defines a dispensing channel with an inlet opening and a dispensing opening for the product to be dispensed from the container,

- a movable cap for closing the dispensing channel near the dispensing opening, which cap is connected by a pivot connection to the spout and which cap has an annular sealing surface that co-operates with an associated annular sealing surface of the spout,

characterised in that snap means are provided which hold the cap in the opened position with respect to the spout.

17. Assembly according claim 16, wherein the snap means comprise a boss formed on the cap, which is located a distance from the pivot axis formed by the pivot connection, and further comprise flexible snap members formed on the spout, wherein the boss comes between the snap members upon fully opening the cap and is held there between.

18. Assembly according to claim 17, in which the cap is provided with a rib extending transverse to the pivot axis, which projects from the periphery of the cap, and wherein the boss is formed on the rib, and wherein the spout is provided

with two ribs extending transverse to the pivot axis, which project beyond the periphery of the spout and on which the snap members are formed, and wherein the rib of the cap comes between the ribs of the spout as the cap is fully opened and the snap members engage on the boss.

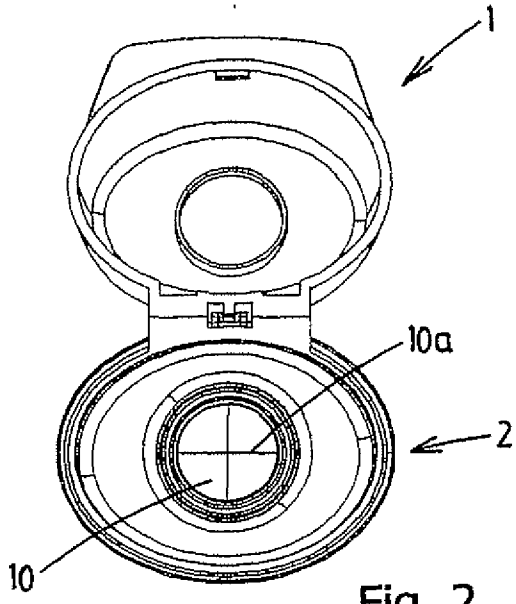

Fig. 2

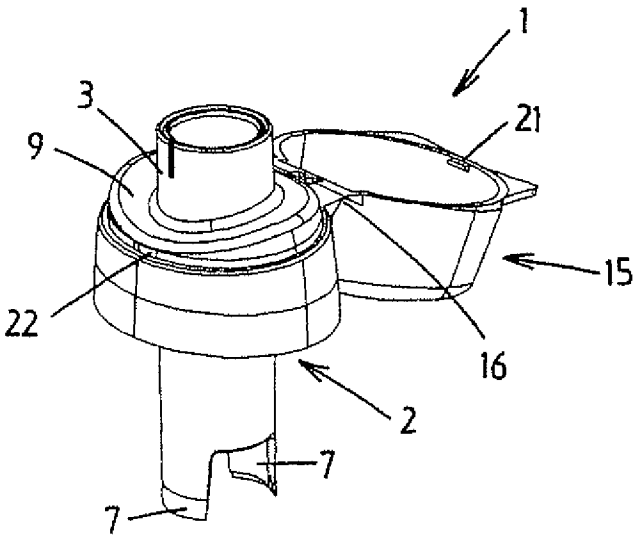

Fig. 1

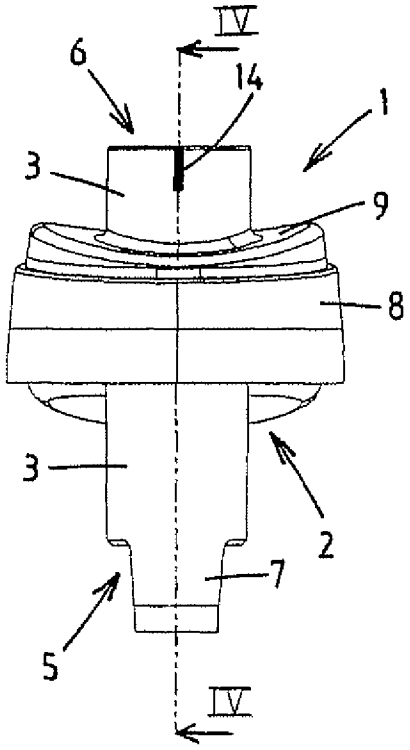

Fig. 3

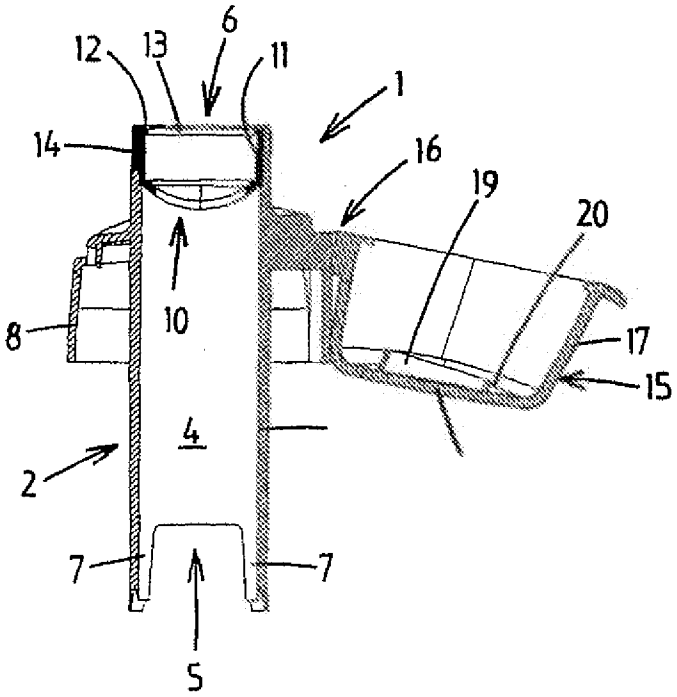

Fig. 4

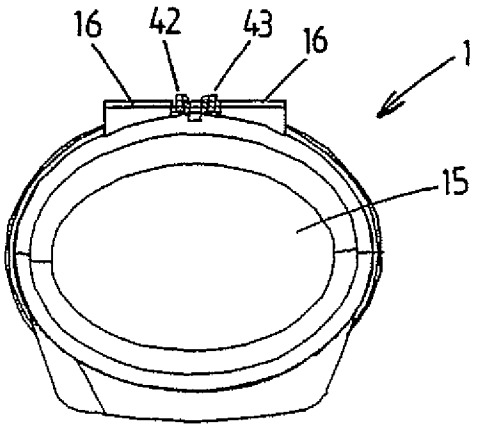

Fig. 6

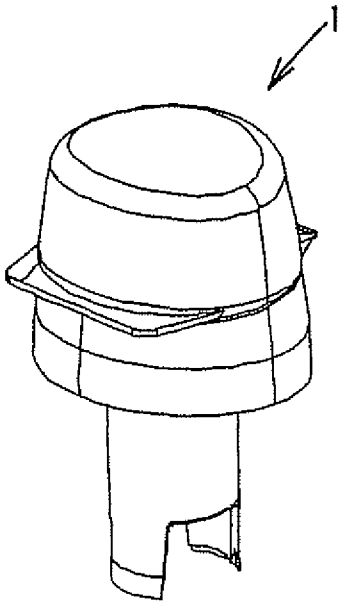

Fig. 5

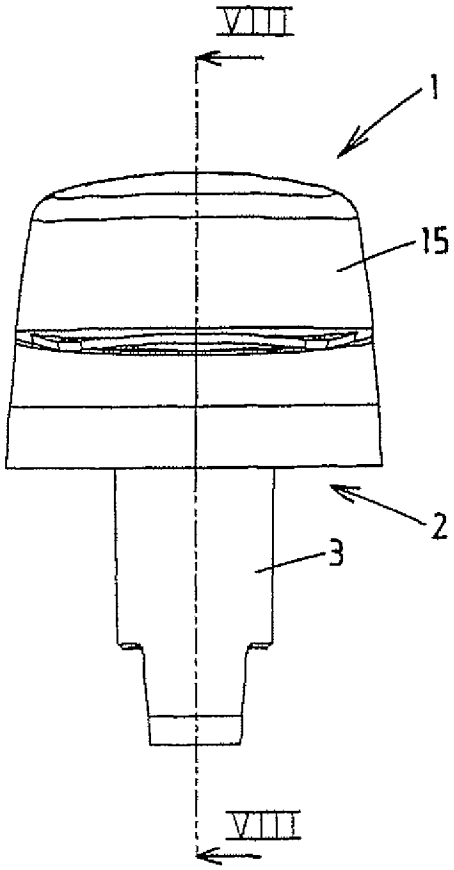

Fig. 7

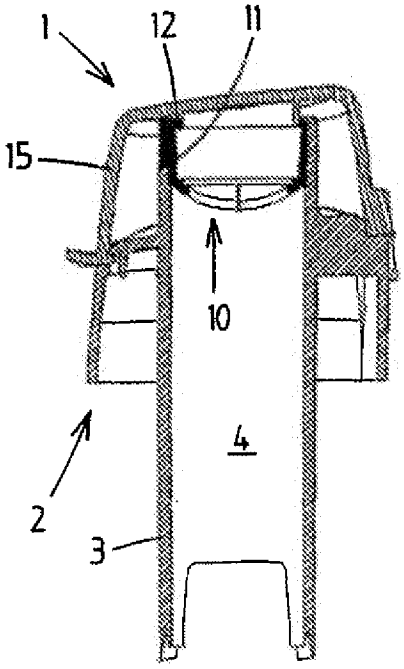

Fig. 8

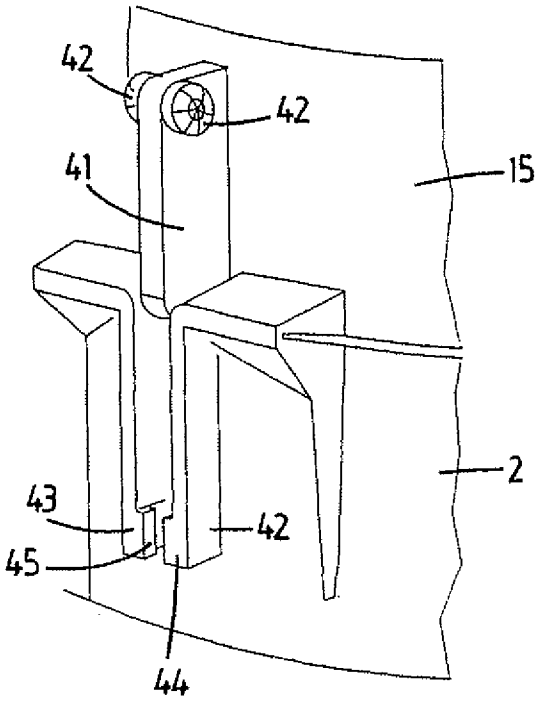

Fig. 9

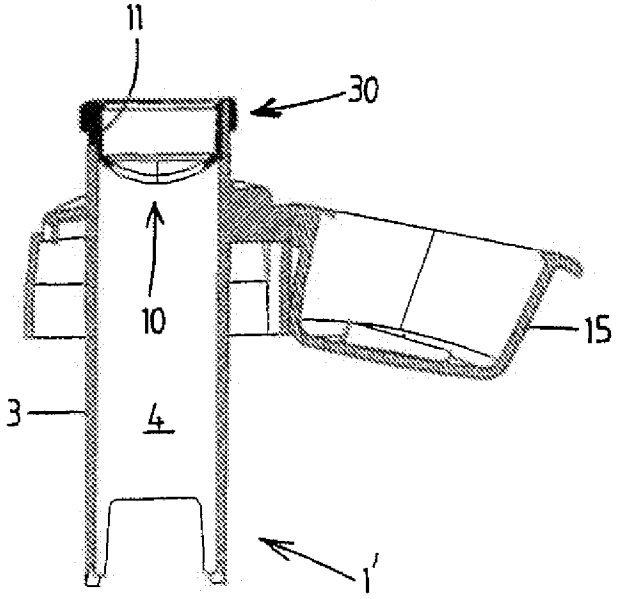

Fig. 10